



THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Mikhail Tarnopolsky and Galina Tarnopolsky

Application no. **10/738,335**

Filed: 12/18/2003

SUBSTITUTE SPECIFICATION

Title: **A PLANETARY TRANSMISSION
FOR A BICYCLE AND METHOD OF
OBTAINING HIGHER RIDING SPEED**

Art Unit: 3682

Examiner: MARCUS, Charles

Commissioner for Patents

P.O. Box 1450

Alexandria, Virginia 22313-1450

In response to the April 15, 2008 Notice of Non-Compliant Amendment and in response to the Office Action dated June 14, 2007 and incorporating discussions from a July 19, 2007 examiner meeting, please amend the above identified patent application in accordance with the below substitute specification:

A PLANETARY TRANSMISSION FOR A BICYCLE AND METHOD OF OBTAINING HIGHER RIDING SPEED

Background of the Invention

A ~~The additional~~ planetary transmission for a bicycle and a method of obtaining ~~getting high~~ higher riding speed due to the interaction between transmissions are based on the experimental data of conversion of gravity into mechanical rotational energy (approved by USA patents 5,667,038; 5,921,133A; 6,363,804 B1; 6,601,478 B2) and experimental data of riding new type of bicycle having planetary transmission(approved by working model since 1999 and two prototypes since 2002)

~~(The present invention is based on the experimental data of conversion of gravity into mechanical rotational energy, which are approved by USA patents 5,667,038; 5,921,133A; 6,363,804 B1; 6,601,478B on the base of videotapes.~~

~~-the result of these experiments as if discovery of a specific gravity, which decreases in a negative zone of free rotation and increases in positive(active) zone of rotation.-)~~

The main difference between the regular and the new type of bicycles is in their pedals'system.

A regular bicycle has a balanced pedals' system with two similar pedals freely rotated around their axes under the foot's muscular energy.

The new type of bicycle has an unbalanced pedals' system with two different pedals. One pedal is a regular one and freely rotates around its axle under the foot's muscular energy.

The other is different in terms that it rotates around its axle not only under the foot's muscular energy, but also under the earth gravity in the positive zone of rotation and under the inertial energy supported by foot's muscular energy in the negative zone of rotation.

The gravitational pedal carries out two functions:

-to transmit the driving power from the foot's muscular energy to a drive wheel of a bicycle

-to transmit the driving power from the foot's muscular energy together with gravitational energy for its recirculation by means of inertial energy, appearing in a negative zone of rotation!

It can be proven by various tests, and gravitational pedal makes it much easier(spending less energy) to ride a bicycle.

The gravitational pedal together with the planetary transmission(Fig 1, Fig 2A. Parts # 4s;5;5A) makes it possible to ride with higher speed of about 35 MPH (average bicyclists speed is of 15-17 MPH) spending the same muscular energy.

~~(-in the present invention the function of the gravitational lever is carried out by special pedal having thereon an unbalanced mass as a source of gravitational energy and planetary mechanism, which increases bicycle's riding speed spending the same muscular energy (the gravitational lever, as a special part of the pedal).~~

~~The transmission of a new speedy bicycle was tested in a laboratory since 1999, after the patent No 5,921,133 was published. The result of reaching riding speed around 35MPH by a non-professional bicyclist and even not a young person shows that a first step toward large-scale production of such bicycles is done)~~

This idea can be a first step towards the production of a faster and more efficient engine systems.

Summary of the Invention

The object of the present intention is provide a new planetary transmission for a bicycle and a method of ~~getting~~ obtaining higher riding speed.

~~(Accordingly, it is an object of the present invention to provide a new additional planetary transmission for a bicycle and a method of getting high riding speed, due to the interaction between transmissions)~~

In keeping with these objectives (and with others which will become apparent hereinafter) one feature of the present invention resides, briefly stated, in a planetary transmission for a bicycle and in a method of ~~getting~~ obtaining higher riding speed, which has ~~the~~ a first rotatable unbalanced element as a receiver of the power from the foot's muscular energy and gravitational energy,

~~(in keeping with these objectives and with others, which will become apparent hereinafter, one feature of the present invention resides, briefly stated in the additional planetary transmission for a bicycle and a method of getting high riding speed, due to the interaction between transmissions, which are first rotatable unbalanced element, as a receiver of power from two different sources of energy, such as the foot's muscular energy and gravitational energy of its unbalanced part)~~

converting both of them (muscular and gravitational) into mechanical energy for transmitting the driving power via the second, one-way directional rotatable element, and the third opposing rotatable element, to a driving sprocket of a bicycle, which is attached to the third element, and freely rotates with the third element on a crank's axle for

transmitting the driving power via a chain to a freewheel and then to a drive wheel of a bicycle, where the bicycle is in a course of forward motion from the pedals,

~~(and converts that energy into rotational mechanical energy for transmission of the driving power, via a second one-way directional element and a third opposing rotatable element to a driving sprocket of a bicycle, (to a driving sprocket of a vehicle) which is fixed to a third element and freely rotates with it on a crank's axle, for transmission of the driving power, via a chain to a freewheel and then to a drive wheel of a bicycle where it is in the course of normal motion from the pedals)~~

and the first rotatable element, being connected to the crank by means of a leading axle, rotates clockwise together with the crank's axle under the foot's muscular energy and the earth gravity into a positive zone of rotation, and under the inertial energy appearing in the negative zone of rotation together with the muscular energy, and at the same time the first element rotates counter-clockwise around it's own axis of rotation together with the leading axle, powered by the foot muscles and the displaced unbalanced mass, while the second rotatable element, being connected to the first rotatable element by means of the overrunning clutch, and also connected to the third element by means of toothing, rotates clockwise around the third element and around the crank's axes of rotation,

~~(The first rotatable element being connected to a crank by leading axle rotates clockwise together with the crank around the crank's axle and at the same time rotates counter-clockwise around it's own axis of rotation together with a leading axle, which is connecting both rotating elements to each other, while the second rotatable element, being connected to the first rotatable element by means of an overrunning clutch and to~~

~~the third rotatable element by means of tothing, rotates clockwise around the third element's and crank's axes)~~

and powered the same way as the first element, and at the same time, the second element rotates counter-clockwise around its own axle of rotation, powered the same way as the first element on its counter-clockwise rotation, and, consequently, makes the third element with the driving sprocket on it, rotate faster than the usual system(meaning the system without this transmission) using the same muscular energy.

~~(And at the same time the second element rotates counter clockwise around its own axle of rotation and due to that, makes the third element as well as the driving sprocket of a bicycle, rotate faster than usual than when the driving sprocket rotates together with a crank's axle under the same equal condition)~~

The method of this invention is based on the interaction between two groups of parts of the transmission, one of which is placed on the crank's axle for a free rotation around it, while the other part is placed on the crank's axle for rotation with it.

~~(The method of the invention includes that steps of interaction between two transmissions, which is powered by two different sources of energy, such as foot's muscular energy and gravitational energy and due to that, provides high riding speed)~~

The invention itself, however, both as to its structure and as to its manner of operation, will be best understood from the following description of a preferred embodiment, which is accompanied by the following drawings.

Brief Description of the drawings

Fig.1 is a vertical sectional view of the schematic representation of a planetary transmission for a bicycle;

Fig.2A is a rear view according to the arrow "A", shown in Fig.1.

Fig.2B is a side view according to the arrow "B", shown in Fig.1; and-

Fig. 3 is a photograph showing a side perspective view of the device of the present invention connected to a transmission and rear wheel of a bicycle.

Detailed Description of the Invention~~a preferred~~ ~~embodiment~~

A preferred embodiment of a planetary transmission of the present invention is illustrated in Fig.1 (vertical sectional view), Fig 2A (rear view) and Fig 2B (side view).

A planetary transmission for a bicycle consisting of a crank 8 and crank's axle (not numbered) as a base for the interaction between two groups of transmission parts, one of which is placed on a crank's axle for rotation around the axle, while the other group of transmission parts is placed on a crank's axle for rotation with the axle. The first group of transmission parts includes sun disk 5 of a planetary mechanism. The second group of transmission parts includes the crank 8. The interaction between two groups of transmission parts will be best understood from the following comparison of a new planetary transmission with the usual transmission for a regular bicycle.

A regular bicycle with the usual transmission has a balanced pedals' system with two similar pedals, which are alternately powered by foot muscles and freely rotates around their axes.

A driving sprocket of a regular bicycle is attached to a crank's axle and rotates with the axle as well as the pedals with the same speed. One turn of the pedals provides one turn of the driving sprocket.

A new type of a bicycle with a planetary transmission has an unbalanced pedals' system with two different pedals. One pedal is a regular one and freely rotates around its axle powered by foot muscles. The other pedal is different in terms that it rotates not only around its axle, but together with a leading axle 2 and powered not only by foot muscles but also by earth gravity (in positive zone of rotation) and by inertia, which is supported by foot muscles by means of a strap 7 (in a negative zone of rotation) because of that this pedal is named "gravitational" and has been assigned reference numeral 1.

The gravitational pedal 1 with an attached unbalanced mass 1a is not symmetrical relative to the axle of rotation 2 (see all drawings). A displacement, which is taken place, provides a possibility for keeping counter-clockwise rotation of the gravitational pedal 1 around its axle together with a leading axle 2, spending the same muscular energy as usual. It is proven by various tests it is also proven by tests, that after reaching a certain speed of rotation of the gravitational pedal (around 3 MPH) it makes much easier (spending less energy) to ride a bicycle. Gravitational pedal 1 connecting to the crank 8 from the side shown by arrow B (Fig.1) by means of a leading axle 2 and a threaded fastening. From the side shown by arrow A (Fig.1) axle 2 connecting with a satellite sprocket 4s as toothing part of an overrunning clutch 3. Such combination, which is known as a standard freewheel, uses in the present invention for a kinematical interaction between gravitational pedal 1 and sun disk 5 by means of a chainomatic periphery 5a(meaning the chain fastening to a sun disk 5) (Fig.1, Fig 2A)

The external toothing in this case is dangerous for a bicyclist and cannot be used.

Driving sprocket 6 is attached to a sun disk 5 and always rotates together with a sun disk 5.

The kinematic relation between the pedal 1, satellite sprocket 4s and driving sprocket 6 is as follows: one clockwise turn of the pedal 1 together with a crank 8 around the crank's axle is making by means of an overrunning clutch 3 one clockwise turn of the sun disk 5 together with a driving sprocket 6. At the same time pedal 1 by means of the same overrunning clutch 3 is making one counter-clockwise turn around its own axle together with the leading axle 2 and satellite sprocket 4s, which is making an additional clockwise turn of a sun disk 5 together with a driving sprocket 6 by means of a chainomatic periphery 5a.

So that, one turn of a gravitational pedal 1 is making more than one turn of a driving sprocket 6, using the same muscular energy. An additional turn of a driving sprocket 6 depends of the chosen kinematic relations between the satellite sprocket 4s and chainomatic periphery 5a of a sun disk 5.

In the prototype of the present invention the sun disk 5 with the driving sprocket 4s thereon outstrips the pedal 1 with a crank 8 by a distance equivalent to the radius of a sundisk 5 with its chainomatic periphery 5a, because in this prototype the length of the circle of the satellite 4s is equal to the radius of a sun disk 5 with the chainomatic periphery 5a thereon.

~~As mentioned herein the planetary transmission for a bicycle has two rotatable parts, one of which is placed on a crank's axle for a rotation around the axle, while the other part is placed on a crank's axle for rotation with the axle. The first group of~~

~~transmission parts includes driving sprocket 6, which is attached to the sun disk 5. The sun disk 5 has a chainomatic periphery 5a. The second group of transmission parts includes the crank 8.~~

~~The kinematic relations between the satellite sprocket 4s and the sun disk 5 by means of a chainomatic periphery 5a is as follows: during one revolution of the pedal 1 with a gravity mass 1a on it, the sun disk 5, by means of its chainomatic periphery 5a, outstrips the crank 8 with the pedal 1 by a distance equivalent to the radius of the sun disk 5, because in this proto type the length of the circle of the satellite sprocket 4s is equal to the radius of the sun disk 5 with the chainomatic periphery 5a.~~

~~(The additional planetary transmission for a bicycle and method of getting higher riding speed, due to the interaction between transmissions, has two rotatable parts, one of which is placed on a crank's axle for a free rotation around it, while the other part is placed on crank's axle for rotation with it.~~

~~The first part includes the driving sprocket of a bicycle which is fixed to a disk 5, having a chainomatic periphery 5a.~~

~~The second part includes crank 8.~~

~~The kinematic relations between the satellite sprocket 4s and chainomatic periphery 5a of disk 5 is as follows: during one revolution disk 5 with a driving sprocket on it outstrips the crank 8 with a pedal 1 for one radius of the disk 5, because the length of the circle of the satellite sprocket 4c is equal to the radius of disk 5 with a chainomatic periphery (according to working model))~~

It should be understood, of course, that the foregoing relates to exemplary embodiments of the invention and that modifications may be made without departing

from the spirit and scope of the invention as set forth in the following claims.~~The~~
~~application is not limited to the detail shown, since various modifications and changes~~
~~are or possible without changing the invention.~~

~~What is desired to be protected by this patent letter is set forth in the appended claims.~~

Claims

What is claimed is:

1. (canceled)

2. (canceled)

3. (canceled)

4. (canceled)

5. (canceled)

6. (currently amended) A planetary transmission for a bicycle, comprising:

~~The~~ a first rotatable unbalanced element as a receiver of the power from a foot's muscular energy and gravitational energy, converting both of them into mechanical energy for transmitting the driving power via the second, one-way directional rotatable element, and the third opposing rotatable element to the driving sprocket of a bicycle, which is attached to the third element and freely rotates with this third element on a crank's axle for transmitting of the driving power via a chain to a free wheel and then to a drive wheel of a bicycle, where the bicycle is in a course of forward motion from the pedals,

~~An additional planetary transmission for a bicycle comprising:~~

~~The first rotatable unbalanced element as a receiver of power from two different sources and energy such as a foot's muscular energy and gravitational energy converts that energy into mechanical energy for transmission of the driving power via a second one-way directional rotatable element and a third opposing rotatable element to a driving sprocket of the bicycle, which is fixed to the third element and freely rotates with it on a crank's axle for transmission of the driving power, via a chain to a freewheel and then to a drive wheel of a bicycle, where it is in a course of normal forward motion from the pedals,)~~

and the first rotatable element, being connected to the crank by means of a leading axle, rotates clockwise together with the crank's axle under the foot's muscular energy and the earth gravity into positive zone of rotation, and under the inertial energy supported by foot's muscular energy in the negative zone of rotation, where the inertial energy is appearing, due to the increased speed of rotation in the positive (active) zone of rotation, and at the same time the first element rotates counter-clockwise around its own axis of rotation together with the leading axle, powered by the foot muscles and the displaced unbalanced mass, while the second rotatable element being connected to the first rotatable element by means of the overrunning clutch, and also connected to the third element by means of tothing, rotates clockwise around the third element and around the crank's axes of rotation, and powered the same way as the first element on its clockwise rotation, and at the same time the second element rotates counter-clockwise around its own axle of rotation, powered the same way as the first element on its counter-clockwise rotation, and consequently, makes the third element with the driving sprocket on it, rotate faster the usual system(meaning the system without this transmission) using the same

muscular energy. (~~The first rotatable element being connected to a crank by means of a leading axle, rotates clockwise together with the crank around the crank's axle and at the same time rotates counter-clockwise around it's own axis of rotation together with the leading axle, which is connecting both rotating element's to each other, while the second rotatable element, being connected to the first rotatable element by means of overrunning clutch and to the third rotatable element by means of tothing, rotates clockwise around the third element and crank's axes of rotation, as well as the first element, and at the same time the second element rotates counter-clockwise around its own axle of rotation and due to that, makes the third element, as well as the driving sprocket of the bicycle, rotate faster than usual, than when the driving sprocket rotates together with the crank's axle under the same equal conditions)~~)

7. (currently amended) A method of ~~getting~~ obtaining higher riding speed comprising the steps of:

- placing ~~a~~ its first rotatable element on a crank,
- placing a second rotatable element on the first element, connecting the first element and the second element to one another by means of an over-running clutch,
- placing the third element on the crank's axle for free rotation on it,
- attaching the crank's to the crank's axle for rotation together with it,
- rotating the first element, powered foot's muscular energy and gravitational energy and converting that energy into mechanical energy for transmission of driving power, via a second one-way directional element to a third opposing rotatable element, which is together with a driving sprocket freely rotates on the crank's axle wherein the

crank being connected to the crank's axle rotates clockwise together with the first element, the first and the second elements at the same time rotate counter-clockwise around their own axes of rotation together within leading axle, which connects the first element and the crank to each other, the second rotatable element being connected to the first and to the third elements at the same time, makes the third element, as well as the driving sprocket of the bicycle rotates faster than usual than when driving sprocket rotates together with the crank's axle under the same equal power conditions.

8. (new) The planetary transmission of claim 6, wherein the first rotatable element is a gravitational pedal as a receiver of energy from earth gravity and energy from foot muscles.

9. (new) The planetary transmission of claim 6, wherein the third element is a sun disk with a chainomatic periphery instead of a gear periphery, while the second element is a satellite sprocket, combined with an overrunning clutch for one-way directional kinematics interaction with a sun disk by means of the chainomatic periphery.

Abstract

A transmission that is rotatable and connectable to the gravity mass increases the speed of rotation.

~~(The rotatable and connectable to one gravity mass transmission is making up speed of riding)~~

REMARKS

In the Office Action dated June 14, 2008, the examiner rejected the claims under 35 U.S.C.112, second paragraph as being indefinite. In addition, the specification was objected to as unclear. A substitute specification under 37 CFR 1.125 section(a) was requested with markings showing changes relative to Applicants' March 13, 2007 amendment.

Applicants met with the examiner on July 19, 2007. On August 30, 2007 Applicants filed a substitute specification. However, Applicants then received a Notice of Non-Compliant Amendment dated April 15, 2008 which indicated that the claim numbering was improper, that the Abstract was not on a separate page, that the new drawing was not properly marked and other irregularities. .

In response to the Office Action and the Notice of Non-Compliant Amendment, Applicants hereby submit a substitute specification marked up to show changes to the specification and claims together with a clean substitute specification. It is respectfully submitted that the current Substitute Specification corrects the irregularities of the previous substitute specification and complies with the rules.

Applicants have added new claims 8 and 9 which essentially track claims 2 and 3. Since these claims are dependent on claim 6, Applicants have canceled the original claims 2 and 3 and put these limitations in claims 8 and 9.

Accompanying this Substitute Specification is a FIG. 3 which is a photograph that has now been labeled as FIG. 3 and has the marking "new drawing" at the top.

Finally, a Power of Attorney has been submitted herein.

Accordingly, it is respectfully submitted that the presented invention is distinguishable over the prior art. The above amendments are understood to place claims 6-9 in a position for allowance and their entry is respectfully requested. It is respectfully requested that amended claims 6-9 be allowed.

Dated: May 14, 2008

Respectfully submitted,



Steven Horowitz, Attorney for Applicants
Registration No. 31,768
295 Madison Avenue, Suite 700
New York, NY 10017
(212) 867-6800
(212) 685-6862 Fax
sh@patentny.com